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college professor; and moreover, as we have been encouraged by kind words, and promises of assistance from various eminent teachers and professors, which, from the contributions received for this our first number, we have reason to believe will be fully realized, we have determined to venture the publication.

We invite, and expect to obtain, the following two classes of persons as readers of our Journal, viz: 1st, Those who are able and willing to communicate valuable information through the Journal; and, 2nd, Those who desire to increase their stock of knowledge and shall find that desire partly supplied by the Journal.

All who feel an interest in the success of the Journal are respectfully solicited to co-operate with, and assist us in extending its circulation.

We earnestly solicit contributions for publication from all who desire to promote the interest and usefulness of the Journal. In selecting matter for publication each month, we will present such as we may think most interesting or of greatest utility.

We will publish from three to five mathematical questions in each number, and will endeavor to select such as are believed to be new, or as seem to possess special interest, and will try to grade them so as to suit the different degrees of advancement of our readers. The solutions to mathematical questions will, in general, be published in the second No. succeeding the one in which the questions are published.

ON THE RELATIVE POSITIONS OF THE ASTEROIDAL ORBITS.

BY PROF. DANIEL KIRKWOOD.

The *Annuaire du Bureau des Longitudes pour l'an* 1873 contains the elements of the orbits of 115 minor planets. The mean number of perihelia for every 15° of longitude is therefore 4.79. It is proposed to inquire whether any marked irregularity obtains in their distribution around the ecliptic.

Of the 115 asteroids in the table only 27 have their perihelia between 150° and 300° of longitude. This is a mean of 2.7 for every 15° of are; while the average number for every 15° of the remaining 210° is 6.28.

Again: a similar irregularity is found in the positions of the ascending nodes; the region of sparse distribution being less extensive than the former, but included within it. Thus, between 225° and 285° we find but 5 ascending nodes, or 1.25 for 15°; while the mean for the remaining 300° is 5.5 for

each arc of 15°. Is this striking disparity merely accidental? or has it resulted from the operation of a physical cause?

The fact may perhaps be sufficiently explained by the remark of Prof. Newcomb that "there is always a tendency in the perihelia of the asteroids to coincide in longitude with the perihelion of Jupiter, and in their nodes to coincide in longitude with the node of Jupiter."

THE RECURRENCE OF ECLIPSES.

BY PROF. DAVID TROWBRIDGE, WATERBURGH, N. Y.

That eclipses recur in the same order in a cycle of about eighteen years was known to the ancient Chaldeans, who probably discovered the period from observation, by comparing together the records of many eclipses. This period, which they called the *saros*, must have been of great advantage to the ancient astronomer in predicting eclipses; since a record of all the solar eclipses (on an ayerage about 41), and of all the lunar eclipses (on an average about 29) in the order in which they occurred, during any one of the complete cycles, would enable him to predict approximately the eclipses of the next succeeding period or cycle. The coincidences required, however, are not sufficiently exact to give more than approximate results; and if there are several intervening cycles, the recurrence is not very reliable even as an approximation. I have never seen in any astronomical work any other periods referred to, (though it is quite possible that *some* work may contain such reference), though other and much more exact periods exist, and one of them only about three times the length of the *saros*, as I shall now show.

According to Bessel the length of the siderial year is 365.2563582 mean solar days.

The mean sidereal revolution of the moon's nodes is equal to 6793.39108 mean solar days.

The revolution of the moon's nodes being accomplished in a direction opposite to the apparent revolution of the sun, if they set out together at any time, they will again come together in less than a year; or really in 346.619848 mean solar days. This is called the mean (as all these periods are mean periods) synodical revolution of the moon's nodes. The mean synodical revolution of the moon, or the period from one new moon to the next succeding new moon, is 29.5305887 mean solar days. The several approximate ratios of these last two numbers will make known to us the